National Aeronautics and Space Administration

Roundup

Lyndon B. Johnson Space Center

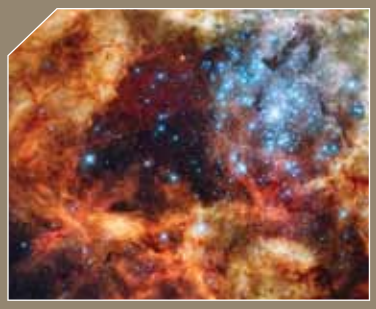
January | **2010**

Reflections 2009

JSC Director

On the cover:

The 2009 Year in Review.



PHOTO/ NASA, ESA, F. Paresce, R. O'Connell and the Wide Field Camera 3 Science Oversight Committee

Photo of the month:

Just in time for the holidays: a Hubble Space Telescope picture postcard of hundreds of brilliant blue stars wreathed by warm, glowing clouds. The festive portrait is the most detailed view of the largest stellar nursery in our local galactic neighborhood. The massive, young stellar grouping, called R136, is only a few million years old and resides in a satellite galaxy of our Milky Way.

NASA/PHOTO

Last year was great for Johnson Space Center, with many accomplishments we can all be proud of. You will read about many of them in this special Year in Review issue of Roundup. It highlights our people, our achievements and why JSC is such a great place to work.

The Partnership for Public Service and American University's Institute for the Study of Public Policy Implementation conduct annual surveys that rate the best places to work in the federal government. Based on responses from more than 212,000 federal employees last year, NASA's workforce continues to score well. The agency is ranked third among large federal agencies as a best place to work.

The rankings also reveal that NASA scored second among all federal agencies in the categories of effective leadership, teamwork and support for diversity, as well as other areas. JSC scored "best in class" in the categories of effective leadership and teamwork. None of this is news to any of us here in Houston. We know that we have the best workforce in the world, but it is nice to be nationally recognized.

As we head into 2010, we can look forward to new challenges and triumphs. We'll fly out the space shuttle manifest safely. In doing so, we'll ensure that the International Space Station is fully functional and stocked with spare parts and equipment for the future. On station, we'll continue to expand science opportunities and document important findings.

Building on the success of the Ares 1-X launch, the Constellation Program will continue several important tests this year as they develop systems and hardware for the future. We'll also continue to work to develop Commercial Crew and Cargo technology to lay a foundation for commercially operated systems capable of transporting to and from the station.

This will be a busy year for all of us, with many operational milestones and transitions. We can't yet predict the direction human spaceflight will ultimately take, but JSC is poised to succeed. We will share the most up-to-date information as we have it and continue to align our workforce with NASA's requirements. The most important measure of how we will be perceived for future endeavors will be how we perform during the remaining critical missions this year. As always, I know you will achieve the highest levels of operational excellence while ensuring that we do it safely.

Have a happy and safe new year.

Mike

In this edition …

Transition

Mike Coats
JSC Director

Space Shuttle Program

We have five flights ahead of us—all in different stages of preparation for flight—and all scheduled to fly before the end of 2010. We are an operational program focused on mission success right up to the final wheels stop, and at the same time, we are reaching milestones that signal the end of the Space Shuttle Program.

Recently, the Astronaut Office named the crew for the final planned shuttle flight and ATK completed the final reusable solid rocket motor casting. The Government Services Administration shuttle artifacts pre-screening Web site went live Sept. 1. Recognizing the bow wave of property we have to divest, the Space Shuttle Program Transition and Retirement Team re-phased the property divestment plan by extending it into Fiscal Year 2012. In October, a JSC Workforce Transition Web site went online to provide additional career planning tools for civil servants that are impacted by shuttle retirement.

Flying out the manifest and conducting transition and retirement activities is a difficult balancing act. As we move toward retirement, and as the nation decides where human spaceflight will go next, we need to be diligent and ensure every mission is safe and successful.

Each final hardware delivery, engine firing, crew naming and completed mission reminds us that this year will go by quickly. Let's make the most of it and make every day count.

Transition resources:

http://transition.jsc.nasa.gov
http://workforcetransition.jsc.nasa.gov
https://sspweb.jsc.nasa.gov/tr/

Johnson Space Center

The successful flight of STS-128 delivered supplies and equipment via a Multi-Purpose Logistics Module to the International Space Station. The success of this mission could not have happened without our talented and dedicated staff continuously "at watch" during each mission.

Next, the Review of the U.S. Human Space Flight Committee submitted its final report to Congress and included several options to be considered in determining the course of human spaceflight moving forward.

On Oct. 28, NASA's Ares I-X rocket completed its successful two-minute powered flight test at Kennedy Space Center. The test flight lasted about six minutes from its launch until splashdown of the rocket's booster stage nearly 150 miles downrange.

Additionally, STS-129 launched on Nov. 16 and featured three spacewalks. This mission was the final space shuttle crew rotation flight to or from the space station and delivered parts and two experiment racks, including two spare gyroscopes, along with the return of a Canadian Space Agency astronaut and station crew member back to Earth.

Fiscal year 2010 will bring us challenges, yet I am confident that each challenge will be met because of our committed and dedicated workforce. Remember that before we can achieve the future, we must perform in the present. NASA's current spaceflight programs, shuttle and station, are our present reality. Our primary responsibility is to safely and successfully complete these programs, along with completing assembly of the International Space Station, and honoring commitments to our international partners.

In the meantime, remember that the JSC transition Web site includes the capability for you to ask questions and provide comments, something I strongly encourage you to take advantage of. I want to know your thoughts and concerns so please visit the JSC transition Web site at http://transition.jsc.nasa.gov and use the "contact us" feature to share your thoughts.

"Transition is the process of evolving from current operations to future operations."

Constellation

NASA's Constellation Program is making great strides toward building the next generation of space exploration vehicles. The program will kick off 2010 with the Constellation Preliminary Design Review and follow with tests on Orion's Launch Abort System. NASA's newest human spaceflight program is well under way with hardware, software and projects in all stages of development. Throughout 2009, Constellation saw significant accomplishments in the Ares, Orion, ground and mission operations and lunar architecture projects.

Ares

Ares I DM-1 Test

The successful test firing of the five-segment Ares I solid rocket motor, Development Motor-1 (DM-1), was conducted Sept. 10. Engineers will use the measurements collected from 650 sensors to evaluate the performance of the motor.

NASA/PHOTO JSC2009E152360

J2-X Engine

NASA engineers successfully completed the first series of tests in the early development of the J-2X engine that will power the Ares I and Ares V rockets. The J2-X engine is the second stage engine for the Ares I rocket.

NASA/PHOTO

Altitude Test Facility

Altitude Test Facility A-3 construction is making great progress at Stennis Space Center. The 300-foot-tall, steel-framed stand will be used to test the J-2X rocket engine. The structure is complete and test infrastructure is being installed. The A-3 test stand is set for completion and activation in 2011.

NASA/PHOTO

NASA/PHOTO KSC2009-5945

Ares I-X test flight

On Oct. 28, the Ares I-X test rocket lifted off from Kennedy Space Center (KSC) for a six-minute flight. The test flight was the first major assessment of the crew launch vehicle. The data returned from more than 700 sensors throughout the rocket will be used to refine the design of future launch vehicles and bring NASA one step closer to reaching its exploration goals.

Orion Crew Exploration Vehicle

In July, the first friction stir weld process took place on an Orion crew module Ground Test Article (GTA) at the Michoud Assembly Facility. This GTA will serve as a production pathfinder to validate the flight vehicle production processes and tools. When completed, this first full-sized, flight-like crew module will be tested on the ground in equivalent flight-like environments, including static vibration, acoustics and water-landing loads. In August, Orion completed its Preliminary Design Review, a major checkpoint that occurs in the design life cycle of a complex engineering project before hardware manufacturing can begin.

NASA/PHOTO JSC2009E152360

Post-landing Orion Recovery Test

NASA/PHOTO JSC2009E116587

The goal of the first suite of Post-landing Orion Recovery Tests (PORT) was to determine the kind of motion astronauts can expect after landing, as well as outside conditions for recovery teams. The test began in late March at the Naval Surface Warfare Center, Carderock Division, in Bethesda, Md., in a controlled water environment. Testing near KSC started in April in the rougher, uncontrolled waters of the Atlantic Ocean. The next testing phase, PORT 2, is being conducted at the Neutral Buoyancy Laboratory and the U.S. Army's Aberdeen Proving Ground. Test cases include evaluating the crew's ability to get out of Orion in the water. NASA paired with U.S. Air Force rescue and recovery experts to determine how parajumpers will assist crews in case of an emergency.

Pad Abort-1

NASA/PHOTO JSC2009E218749

Preparations for Orion's first flight test, Pad Abort-1 (PA-1), are under way at the new Orion launch complex 32E at White Sands Missile Range in New Mexico. PA-1 will test Orion's launch abort system, which is designed to pull the crew away safely from the launch vehicle in the event of an emergency on the launch pad or during initial ascent. The launch abort system pathfinder has been instrumental in fine-tuning the stacking operations that will mate the PA-1 flight test launch abort system to the flight test crew module. The system's abort and jettison motors were integrated in preparation for the test flight and will be joined by the attitude control motor early this year.

Ground Operations

KSC's Launch Control Center went through tremendous renovations to support the systems required for the Ares rockets and Orion spacecraft. Firing Room 1, which has overseen the Space Shuttle and Apollo Programs, is poised to take over the first launch of the shuttle's replacement and will also serve as the firing room for future Ares I flight tests and operational Ares I and Orion launches.

NASA/PHOTO KSC2009-5089

Launch Pad 39B

On May 31, the Space Shuttle Program handed Launch Pad 39B over to the Constellation Program. The pad originally was built for the Saturn V rockets that launched Apollo capsules to the moon. In July 1975, the pad was modified to support shuttle operations. Crews made necessary alterations to support the Ares 1-X test in late October.

NASA/PHOTO KSC2009-5103

Ares Mobile Launch Platform

NASA/PHOTO KSC2009-6652

Construction is under way on a new mobile launcher for the Constellation Program. The platform will be the base for the Ares rockets to launch the Orion crew exploration vehicle and the cargo vehicle. When the structural portion of the new launcher is complete, umbilical lines, access arms, communications equipment and command/control equipment will be installed.

Mission Operations

NASA/PHOTO

Constellation's Mission Operations held the first of two planned virtual missions this summer to simulate planning processes and use new software designed to reduce mission certification time. These practices are a tool to verify that NASA has the right procedures in place to achieve reduced flight preparation time.

Lunar Architecture Field Testing

NASA/PHOTO JSC2009E206201

Multiple prototypes of Constellation hardware were tested this past fall in lunar-like conditions, including the Tri-ATHLETE mobility platform and the Lunar Electric Rover during the 2009 Desert Research and Technology Studies activity. The most involved excursion was 14 days long, with two crew members living in and working from the Lunar Electric Rover, performing relevant science and mission operations exercises.

Outreach

Sharing the excitement of exploring space is one of the most rewarding aspects of our careers at Johnson Space Center. Reaching out and engaging the public is a year-round effort supported by team members from all areas of the space program. JSC staffers traveled throughout our region, across the United States and around the world to both educate and inspire audiences in 2009.

Air shows, conferences, festivals, museums, science centers, sporting events and even aquariums were all community outreach venues this past year. Local annual events such as Rodeo Houston, Yuri's Night and Wings Over Houston were favorites again this year.

NASA/MARKOWITZ JSC2009E227626

JSC's presence at Wings Over Houston provided a huge awe factor for the crowds.

Space Week Texas 2009

Billed as a space exploration celebration as big as the Lone Star state, Space Week Texas 2009 was a week-long celebration focused on the positive educational and economic impact NASA has in this great state. The celebration kicked off on March 4 at the University of Texas campus. Next were stops at the Texas capitol and the Lyndon Baines Johnson (LBJ) Presidential Library and Museum in Austin. The week ended at the George Bush Presidential Library and Museum in College Station. Space exhibits, educational presentations, astronaut appearances, legislative resolutions and the chance to touch a 3-billion-year-old moon rock were highlighted events throughout the week.

NASA/PHOTO JSC2009E053424

Students and teachers celebrate NASA at the Texas capitol during Space Week.

NASA's 50th anniversary, the International Space Station's 10th anniversary and the 40th anniversary of the Apollo 11 lunar landing were also a part of the celebration. Space Week gave thousands of students, teachers and members of the public a chance to see what NASA's next giant leap will be.

Speakers Bureau

From New York to California, Australia to Scotland, JSC's Speakers Bureau presenters traveled the country and the world to educate and inform thousands of audience members about the exciting mission of America's space agency. With topics ranging from NASA's 50th anniversary to aeronautics to the benefits of space exploration, JSC team members offered their unique perspectives to students, teachers, business leaders and the general public during almost 200 presentations.

NASA/PHOTO JSC2009E246749

JSC's Michael Lutomski speaks to an audience in Perth, Australia, about risk management and the International Space Station.

Since 1962, the JSC Speakers Bureau has offered free presentations on an increasing variety of NASA-related topics to organizations interested in space exploration and aeronautics. With the majority of presentations to schools in 2009, the Speakers Bureau continues to support NASA's mission of inspiring the next generation of explorers.

Apollo 11 40th Anniversary

This year was full of milestones, but one stood out this summer a little more than the rest. NASA celebrated the 40th anniversary of the lunar landing the week of July 20. Apollo 11 launched from Kennedy Space Center on July 16, 1969. Four days later, on July 20, history was made when humans set foot on another world.

JSC employees, Houstonians and the nation joined the anniversary festivities by attending NASA Night at the Astros, movie screenings at Discovery Green and University of Houston at Clear Lake, stargazing parties and much more.

NASA/PHOTO JSC2009E147857

Apollo 11 astronauts Neil Armstrong and Buzz Aldrin celebrate the 40th anniversary of the lunar landing at Space Center Houston alongside JSC Director Mike Coats and Congresswoman Sheila Jackson Lee.

NASA Nights

Sports fans turned into space fans throughout 2009 at a series of NASA Nights sponsored by several of Houston's sports teams. The Astros, Rockets, Texans, Dynamos and Rice University Owls each showcased NASA and its half century of space exploration accomplishments. Ceremonial first pitches, space exhibits and astronaut autograph sessions were all part of the festivities.

NASA/PHOTO jsc2009e146385

Apollo-era veterans prepare to throw out the ceremonial first pitch at the Houston Astros' NASA Night.

NASA/PHOTO jsc2009e222699

JSC Director Mike Coats presents the John F. Kennedy family and the president of Rice University with a lunar rock as part of NASA's Ambassador Program during Rice University's NASA Night.

Hometown Heroes

Hometown Heroes rolled out with a little twist this year. Not only did six astronauts throw out the ceremonial first pitch at Major League Baseball (MLB) games, but six more astronauts participated in pre-game and halftime activities at National Collegiate Athletic Association (NCAA) football games. These astronauts traveled back to their home regions to promote NASA's celebration of the International Space Station's 10th year in orbit and the Apollo 11 40th anniversary. Their visits also promoted human spaceflight to the local media and various community outlets.

The cities touched by the outreach program included Chicago, Atlanta, Cincinnati, San Diego, New York, St. Louis, Champaign-Urbana, Gainesville, Boulder, West Point, Winston-Salem and Pittsburgh.

NASA/PHOTO jsc2009e226847

One of astronaut Bill McArthur's young fans from the Highland Falls Middle School in Highland Falls, N.Y., holds a personally signed lithograph while listening to McArthur's talk.

MLB Hometown Heroes Astronauts:

- John Grunsfeld
- Shane Kimbrough
- Greg H. Johnson
- Tracy Caldwell
- Mike Massimino
- Sandra Magnus

NCAA Hometown Heroes Astronauts:

- Lee Archambault
- Shane Kimbrough
- Steve Swanson
- Bill McArthur
- Tom Marshburn
- Mike Fincke

Driven to Explore

NASA's Driven to Explore (DTE) Constellation exhibit brought space exploration to audiences of all ages in 2009. The exhibit is a mobile, multimedia experience showcasing the Space Shuttle Program, the progress of the International Space Station and benefits of space exploration leading in NASA's next major program, Constellation.

The centerpiece of DTE is a lunar rock sample picked up on the moon and brought back to Earth by the astronauts of Apollo 17 in 1972, America's last human mission to the moon. The 3-billion-year-old rock is one of only seven lunar samples in the world made available for the public to touch and feel.

The first stop for DTE was Space Week Texas 2009 in Austin from March 4 through 12. The exhibit was displayed at the University of Texas campus, the capitol and various presidential libraries and museums.

The trailer continued touring the country, making stops throughout Kansas and Oklahoma from April 4 to May 12. The two-state tour included visits to the Kansas Cosmosphere and Space Center, University of Kansas, Tulsa Air and Space Museum, University of Oklahoma and many more.

After those stops it was back to Houston, where the exhibit made appearances at the Freedom Over Texas celebration on July 4 and Discovery Green for the Apollo 11 40th anniversary July 20.

NASA/PHOTO jsc2009e227653

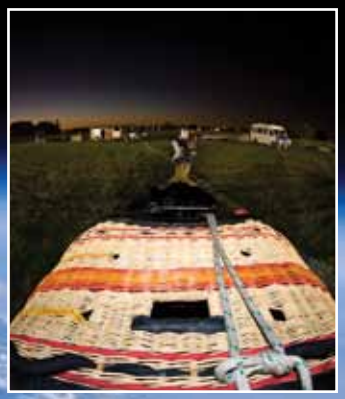
The inside of the Driven to Explore exhibit has plenty for all to see.

To close out the year, the exhibit went on another two-state tour in Nebraska and South Dakota from Aug. 19 to Sept. 19. Stops included the Journey Museum, South Dakota State University, Nebraska State Fair, Omaha Children's Museum and others.

Around the Center

Last year was a great year to be a part of the Johnson Space Center family. Not only did team members enjoy working toward mission success, but employees strengthened relationships and became a part of history by participating in exciting JSC events.

Popular activities included the 16th Annual Ballunar Liftoff Festival and JSC Open House, Bring Our Children to Work Day, JSC Picnic, Safety and Total Health Day, the rodeo trail ride down Second Street, visits from the Houston Astros and Dynamo teams and more.



NASA/PHOTO JSC2009E225854

The JSC Collaboration Center will make it easier than ever to share new ideas among the center population.

Embarking on a new path

There are organizations people talk about … and then there are organizations people rave about. The Inclusion and Innovation (I&I) Council, chartered by JSC Director Mike Coats, recognized the value in adopting industry best practices to better our work environment.

Last August, seven I&I Engagement Teams were formed, and each was asked to develop recommendations for improving JSC. The teams, including civil servants and contractors, were designed to bring together people with diverse backgrounds, skills and perspectives to explore ways to enhance the JSC work environment, making it a more inclusive and better place to work.

The Information Technology Engagement Team's idea was creating a JSC Collaboration Center. The stars aligned to support their suggestion, with the planned renovation of the Building 3 café presenting an opportunity to incorporate fresh ideas. An area in the dining room will be converted into a place where people from different disciplines can team up. The center will be equipped with Wi-Fi, white boards and a 52-inch monitor. By welcoming diverse groups to a central location and making it easier to connect, creativity can be more easily fostered. The renovations are to be completed by spring 2010.

And while October is normally known for its harvest moons, this past October JSC began looking over the innovation horizon in a whole new way—thanks to its Blue Moon Project.

Born out of the I&I Council, the Blue Moon innovation concept and its working group developed a software tool that allows all JSC team members to be a part of the solution.

The tool will let issues be posted and viewed by anyone logging into the software. The goal of the project is to reduce barriers and issues by encouraging employees to use the tool to post and view technical and non-technical challenges. Once problems are posted, team members are able to offer solutions.

By exposing issues to a larger, more diverse and cross-disciplined audience, the exposure will stir the minds of those who may have an applicable idea that leads to a new thought or solution to the matter. Historically, solutions of what seemed to be insurmountable problems were solved in a very matter-of-fact way by people outside of the industry or discipline. With the Blue Moon Project, JSC team members can use this business best-practice to advance the center. For more information on Blue Moon, visit: **http://af.jsc.nasa.gov/**

To learn more about how the center is working for you, visit: **http://projects.jsc.nasa.gov/ii/default.aspx and http://jlt.jsc.nasa.gov/**

NASA/STAFFORD JSC2009E147881

Legendary Apollo 11 astronaut Buzz Aldrin addresses the crowd at the Space Center Houston Splashdown Party.

Apollo 40th Anniversary

JSC devised some special activities for this anniversary, including roundtable discussions, the screening of "Moon Machines," ice cream and hot dog socials and tours of the Lunar Lab in Building 31. On July 24, reminiscing culminated in the Splashdown Party at Space Center Houston. Apollo 11 astronauts Neil Armstrong and Buzz Aldrin joined this historic get-together. Friends, families and employees had the rare chance to mingle with the two men that first set foot on the moon.

NASA/BLAIR JSC2009E147347

At the Apollo 40th anniversary storytelling event, Lunar Module extraordinaire Bob Carlton talked about how NASA really did the impossible when Apollo 11 landed on the moon.

Gray matters … at JSC

Man has been telling stories since the dawn of time. In this technological age, we tend to ignore voices of wisdom for hard facts and research. But, in 2009, the JSC Knowledge Management Office resurrected the practice of storytelling, putting a new spin on a centuries-old tradition.

The initial kickoff storytelling event, "Wisdom and Lessons Learned from the Power and Propulsion Division," showed JSC team members that what we learned initially with rocketry can be applied to the next generation of space vehicles.

Further storytelling events, with topics ranging from hurricane preparedness to "Telling the Stories of Apollo: a Conversation With Apollo Managers," showed JSC team members that "our most important knowledge isn't in a database, and it's not a computer application—it's in our stories," said Lessons Learned Manager Brent Fontenot.

Sharing our spirit

On Dec. 2, volunteers from JSC, Space Center Volunteers and Help Our Military Endure (HOME) joined forces to assemble care packages to be sent to deployed troops this holiday season. The endeavor was a true team effort, with JSC team members donating items, Clear Creek Independent School District students writing more than 1,000 letters to be included in the packages, and everyone showing up to pack and label the boxes. In the span of a few hours, about 500 boxes were packed.

NASA/STAFFORD JSC2009E246265

Volunteers took time from their busy schedules to assemble care packages for the troops who can't be with their families this holiday season.

JSC thanks the Sheltons for 21 years of generosity

Since STS-26 in 1988, a beautiful bouquet of roses has appeared amid the stark blue consoles and telemetry-filled screens of the shuttle Mission Control Center (MCC). Space enthusiasts Mark, Terry and their daughter MacKenzie Shelton of Bedford, Texas, have been sending the roses—one for each space shuttle crew member and a white rose for those lost in flight—for every shuttle mission for the past 21 years.

The STS-119 mission marked the 100th delivery of roses to the MCC, but it was a little different this time around. On March 26, the Sheltons personally delivered the bouquet to mission control to a crowd of appreciative flight controllers.

Over the space-to-ground loop, *Discovery* Commander Lee Archambault expressed his gratitude to the family.

"Our space program is built around the solid support of the United States public," Archambault said. "No family embodies that support more than you, the Shelton family."

Mark Shelton closed the ceremony with a humble tribute to everyone at JSC. "We really do know that what you do is important," Shelton said. "We are envious that you get to do something so important every day. This means a lot to us, but not as much as ya'll mean to us."

NASA/MARKOWITZ JSC2009E063348

MacKenzie Shelton places roses on a shuttle Mission Control console during the STS-119 mission, while Mark Shelton (left) and Terry Shelton (right) look on.

Media Moments

While NASA's galactic missions typically garner the most attention from the press, 2009 provided some unique and fresh media moments for Johnson Space Center.

NASA/PHOTO JSC2009E141719

Deborah Duncan, host of the "Great Day Houston" TV show, takes a swig of recycled water that had previously been processed through the Urine Processing Assembly. The taste test was part of a show dedicated entirely to celebrating NASA's past, present and future.

PHOTO/U2

U2's Bono (left) and Edge occupy the seats normally reserved for Spacecraft Communicators during a brief visit to JSC's Mission Control Center. The Irish rockers were able to talk to crew members aboard the International Space Station.

NASA/PHOTO JSC2009E082550

NASA Astronaut Jose Hernandez was interviewed on the Oprah Winfrey Show to talk about his humble beginnings as a migrant worker in California and the importance of never giving up on your dreams. The profile on Hernandez was part of a special show titled "Don't Stop Believing!"

NASA/PHOTO JSC2009E017945

During the 2009 Presidential Inaugural Parade, President Barack Obama, First Lady Michelle Obama and Vice President Joe Biden watch as the NASA Lunar Electric Rover maneuvers in front of the presidential reviewing stand on Pennsylvania Avenue.

Social Media Mania

Social media has taken the world by storm. Networking sites like Twitter and Facebook give people the opportunity to connect with one another in an instant, from all reaches of the world—and even space.

Astronaut Mike Massimino became the first person to tweet from space on his final trip to repair the Hubble Space Telescope. Now he's back on Earth, and his followers keep growing in number. Massimino has more than 1.2 million people following him on the popular site. According to various Twitter statistics, Massimino's account is ranked 139th by number of followers across all users and is ranked first in Houston.

- Astronaut Mike Massimino became the first person to tweet from space while servicing the Hubble Space Telescope on STS-125 in May (@Astro_Mike).
- Station Expedition 21 Flight Engineer and Commander Jeff Williams has detailed his training and is providing updates on his flight via Twitter, including video and still imagery (@Astro_Jeff).
- Aboard the space station, Expedition 21 Flight Engineer Nicole Stott, who traveled to the complex aboard mission STS-128 in September, is providing insights of her time in space (@Astro_Nicole).
- Astronauts and twins Mark Kelly and Scott Kelly, slated to respectively command the space shuttle and the International Space Station next year, are sharing their unique perspectives with the Twitter community—and with each other—as they train at locations around the world (Mark Kelly is @shuttlecdrkelly; Scott Kelly is @stationcdrkelly).
- Astronaut Jose Hernandez provided NASA's first bilingual Twitter (in English and Spanish). Hernandez has provided insights on his training and his work in flight, and he is now posting details of his post-mission activities (@Astro_Jose).
- As of December, 16 astronauts have joined Twitter. Follow us and NASA astronauts on these sites:

Twitter: @NASA_Johnson, @NASA_Astronauts, @NASA_Explore
Facebook: NASA and NASA2Explore
YouTube: ReelNASA

Go to http://www.nasa.gov/connect to find more NASA social media sites.

Security … now spelled ICAM

With the completion of the agency's re-badging activities and physical security updates, NASA met its critical Homeland Security Presidential Directive (HSPD)-12 milestones. Now the agency is ready to leverage those changes to bring improved Information Technology (IT) capabilities to NASA centers.

Identity, Credential, and Access Management (ICAM) is a new area of focus equipped with the projects and tools to support our missions by ensuring a secure and reliable IT environment. From the smartcard badge you use to get on site to the account you use to send e-mail, NASA's IT systems are becoming increasingly integrated so that you can get access to what you need, when you need it. ICAM projects address the questions: "Who are you?" (identity management), "How do you prove it?" (credential management) and "What systems can you access?" (access management). The Information Resources Directorate and Center Operations Directorate will be at the core of pulling together this enterprise.

These ICAM transformations will usher in an improved way of doing business at NASA by modernizing our IT world with features such as User Self-Service. This means you can customize your contact information, from e-mail aliases to how your name is displayed in NASA online directories.

Improvements don't stop there. "The Access Launchpad" is an online tool that you can use to create and update your NASA user profile or reset a forgotten password, all in a few steps.

The NASA Enterprise Directory, which replaces the former X500, is a modernized online e-mail, phone and information directory that helps make searching for NASA colleagues' contact information easier.

The Identity Management and Account Exchange, commonly known as IdMAX, is a fresh gateway to accessing multiple IT tools used for badging, computer access and updating personal information in NASA's public information directories.

Ease and security is key in our work setting. One ICAM initiative currently being implemented is the consolidation of desktop access agencywide. This enhancement will provide a common desktop login across NASA, allowing employees to have easier access to IT resources when visiting other centers.

While HSPD-12 gave us better physical security, ICAM is poised to reform the IT landscape at NASA and Johnson Space Center so that NASA users have the right access to IT systems, when and where they need them.

For more information, please visit the ICAM agency Web site: **http://insidenasa.nasa.gov/ocio/infrastructure/icam.html**

Updated security processes:

- **Standard operating procedures for Personal Identity Verification badging are in place across the agency for civil servants and contractors**
- **Over 1,100 applications are managed through the NASA Management Account System**
- **A single physical access control system now enables employees to travel from one center to another with facility access granted on request**
- **The NASA infrastructure supports the use of smartcards on the desktop and IT systems**

Recovery Act brings revitalization

A series of repair work began on site as recovery from Hurricane Ike progressed into Phase II and will continue well into 2010. The work is funded with the American Recovery and Reinvestment Act of 2009 (ARRA or Recovery Act). The ARRA, known originally as the stimulus bill, was signed by President Obama on Feb. 17.

Phase I was initiated soon after Hurricane Ike and funded with $30 million (not from the ARRA). The most urgent repairs from Ike were undertaken in Phase I.

Phase II was initiated in February. Much of the Phase II construction involves replacing roofs and repairing loggia ledges on additional buildings. Windows on floors one to eight of Building 1 wil also be replaced, as well as numerous other repairs. Work is expected to last through September 2010.

Other repairs will include waterproofing building panels, replacing damaged carpet, caulking leaking windows and edges, and replacing street, parking lot and sidewalk lights. Buildings affected by the repairs include: 1, 2S, 4N, 5, 7, 8, 9S, 10, 11N, 13, 14, 15, 16, 17, 24, 25, 30, 31, 32, 33, 35, 36, 37, 44, 45, 46, 48, 49, 221, 222, 261, 350 and Hangar 280. In all, 33 buildings will receive repairs.

JSC received more than $280 million in ARRA funds, which aren't limited to repair work. Other projects include the acceleration of Orion, commercial crew development, station common docking adapter development and updates to WB-57 aircraft.

Continue learning the latest on the Recovery Act revitalization by going to JSC Features online: **http://www.jsc.nasa.gov/jscfeatures/**

NASA/SOWA jsc2009e242638

The repair of the Building 7 roof (center) is nearly complete. Notice the light color of the new roof. Materials being used on the repaired roofs no longer include the use of gravel, eliminating a source of projectiles during high winds.

Missions

Expedition 18

On Oct. 12, 2008, at 2:01 a.m. CDT, NASA astronaut Michael Fincke, spaceflight participant Richard Garriott and Russian cosmonaut Yury Lonchakov launched aboard the Soyuz TMA-13 spacecraft to the International Space Station from the Baikonur Cosmodrome in Kazakhstan. The crew replaced two cosmonauts who had been in space for six months while NASA astronaut Gregory Chamitoff remained onboard for another month, awaiting his ride home on the Space Shuttle *Endeavour*. The arrival of Expedition 18 marked the beginning of a test period for equipment that supported the expansion of station crews to six people.

Two days after launch, the Soyuz TMA-13 craft docked to the Zarya module of the Russian segment of the station. Fincke and Lonchakov joined NASA Flight Engineer and Science Officer Chamitoff, who arrived at the station on *Discovery* in June. Chamitoff was replaced in November by NASA astronaut Sandra Magnus during shuttle *Endeavour's* STS-126 mission, which brought Chamitoff home.

Endeavour's crew delivered new hardware and supplies to the station, such as the Leonardo Multi-Purpose Logistics Module, which was berthed to the Earth-facing port of the Harmony connecting module for the duration of the shuttle's visit. The hardware included new environmental systems to support the expansion of the station to six crew members, including a second toilet, a new treadmill, a water regeneration system, more sleeping quarters and an additional oxygen generation system.

Magnus was replaced by Japan Aerospace Exploration Agency (JAXA) astronaut Koichi Wakata in February on the STS-119 mission that delivered the final set of U.S. solar arrays, the S6 truss, to the station. Wakata, the first Japanese long-duration crew member on station, returned to Earth on the STS-127 mission in July.

The Expedition 18 crew continued working on experiments in the voluminous laboratory. Many of these experiments will help with planning future exploration missions to the moon and Mars.

NASA/PHOTO ISS018-E-033767

Astronaut Michael Fincke (right), Expedition 18 commander; astronaut Sandra Magnus and cosmonaut Yury Lonchakov, both flight engineers, pose for a crew photo between a Russian Orlan spacesuit and an Extravehicular Mobility Unit spacesuit inside the International Space Station.

STS-119

Space Shuttle *Discovery* lifted off from Kennedy Space Center (KSC) in Florida at 6:43 p.m. CDT on March 15, on a mission to bring full power to the station. Commander Lee Archambault led the crew of seven, which included Pilot Tony Antonelli, Mission Specialists Joseph Acaba, Steve Swanson, Richard Arnold, John Phillips and JAXA astronaut Koichi Wakata.

The 13-day mission included three spacewalks to install the S6 truss and starboard-side outboard U.S. solar arrays. The shuttle crew also delivered and helped install a replacement distillation assembly centrifuge to the station's water recycling system. Having both the solar arrays and the recycling system up and running enabled the orbiting laboratory to double its crew size to six. A highlight to the mission was a call from U.S. President Barack Obama to the shuttle and station crew members gathered in the Harmony module.

Wakata remained aboard the station, replacing Flight Engineer Sandra Magnus. Magnus returned to Earth with the STS-119 crew after more than four months of living and working in space.

Discovery glided to a perfect touchdown at KSC on March 28 at 2:14 p.m. CDT, completing STS-119.

NASA/PHOTO S119-E-006840

STS-119 Mission Specialist Steve Swanson participates in the mission's second spacewalk.

NASA/PHOTO S119-E-010500

Backdropped by the blackness of space and the thin line of Earth's atmosphere, the International Space Station is seen from Space Shuttle Discovery *as the two spacecraft begin their relative separation. The STS-119 and Expedition 18 crews concluded 9 days, 20 hours and 10 minutes of cooperative work onboard the shuttle and station.*

Expedition 19/20

Expedition 19 left Earth on March 26 at 6:49 a.m. CDT and headed to station from the Baikonur Cosmodrome in Kazakhstan. This mission ultimately expanded the station to six crew members. Onboard the Russian Soyuz TMA-14 spacecraft was cosmonaut Gennady Padalka, NASA astronaut Michael Barratt and spaceflight participant Charles Simonyi. Padalka and Barratt spent about six months on the complex. Simonyi spent 10 days on the station under a commercial agreement with the Russian Federal Space Agency.

They joined Wakata, who was launched to the station during STS-119. Wakata transitioned from Expedition 18 to 19 once Padalka and Barratt took over station operations.

Padalka and Barratt conducted more than a week of handover activities with Fincke, Lonchakov and Wakata, familiarizing themselves with station systems and procedures. They received proficiency training on the Canadarm2 robotic arm from the resident crew, engaged in safety briefings and received payload and scientific equipment training. The Expedition 19 crew worked with various experiments dealing with human life and physical sciences. They also completed Earth observations and conducted technology demonstrations.

On May 27, cosmonaut Roman Romanenko, Canadian Space Agency astronaut Robert Thirsk and European Space Agency astronaut Frank De Winne launched from Baikonur aboard the Soyuz TMA-15 spacecraft. They docked with the space station May 29, inaugurating the long-awaited presence of a six-person crew. It also marked the moment when all five partner agencies were represented in the orbiting laboratory and began Expedition 20, which remained under the command of Padalka. Astronaut Tim Kopra served as a flight engineer for Expedition 20.

Within days of Expedition 20's arrival, Padalka and Barratt completed two spacewalks on June 5 and June 10. Their first spacewalk was to prepare the Zvezda service module for the arrival of a new Russian module, the Mini-Research Module 2 (MRM2). They also installed docking antennas and a docking target and electrical connectors for the Kurs automated rendezvous equipment. The second spacewalk repositioned an internal docking mechanism in the Zvezda service module for the MRM2.

NASA/PHOTO S125E006948

An STS-125 crew member onboard Atlantis *snapped a photo of the Hubble Space Telescope following a grapple of the giant observatory by the shuttle's Canadian-built Remote Manipulator System.*

STS-125

Space Shuttle *Atlantis* began the STS-125 mission with an on-time launch from KSC on May 11 at 1:01 p.m. CDT. Veteran astronaut Scott Altman commanded the final space shuttle mission to the Hubble Space Telescope. Astronaut Gregory C. Johnson served as pilot. Mission specialists included veteran spacewalkers John Grunsfeld and Mike Massimino and first-time space fliers Andrew Feustel, Michael Good and Megan McArthur.

The mission included five spacewalks on consecutive days, completing all the mission's objectives for servicing and replacing some of Hubble's key instruments and equipment and extending its life well into the next decade.

Originally planned as an 11-day mission, the Florida weather that favored launch did not hold for landing. With relentless rain and storms plaguing the coast, landing at KSC was waved off for three consecutive days, prompting a touchdown at Edwards Air Force Base in California on May 24.

When the STS-125 astronauts' nearly 5.3-million-mile journey ended, it marked the final time that humans would touch the legendary telescope.

NASA/PHOTO ISS019-E-010170

Astronaut Michael Barratt, Expedition 19/20 flight engineer, performs an insertion of urine samples into the Minus Eighty Degree Laboratory Freezer station as part of the Nutritional Status Assessment study in the Kibo laboratory.

Expedition 21/22

Expedition 21 began with the Soyuz TMA-14 undocking in October. Two new crew members arrived on the Soyuz TMA-16 for the handover before the previous crew departed.

The Expedition 21 crew consisted of Commander Jeffrey Williams and Flight Engineers Nicole Stott, Frank De Winne, Roman Romanenko, Maxim Suraev and Robert Thirsk.

Expedition 22 included Commander Jeffrey Williams and Oleg Kotov, T.J. Creamer, Maxim Suraev and Soichi Noguchi, all flight engineers. Kotov, Creamer and Noguchi launched to station on Dec. 20 at 3:52 p.m. CST on Soyuz TMA-17.

The Expedition 21 and 22 crews set up and activated new research facilities, such as the Fluids Integrated Rack and Materials Science Research Rack 1. They activated the new Combined Operational Load-Bearing External Resistance Treadmill (COLBERT), robotically captured the Japanese H-II Transfer Vehicle and welcomed a new Russian docking module, a shuttle crew and a Progress resupply ship.

The crews also continued working with experiments that will shed light into the mysteries of science and technology and further studies in long-duration spaceflight.

STS-127

Space Shuttle *Endeavour* and a crew of seven astronauts lifted off from KSC at 5:03 p.m. CDT on July 15. Mark Polansky commanded STS-127, while Doug Hurley served as pilot. Mission specialists were Christopher Cassidy, Tom Marshburn, Dave Wolf, Tim Kopra and Julie Payette, a Canadian Space Agency astronaut.

The liftoff followed several prior launch attempts. The first two tries in June were foiled by a gaseous hydrogen leak from the Ground Umbilical Carrier Plate, which attaches a gaseous hydrogen vent line to the shuttle's external fuel tank. Crews worked tirelessly to investigate and repair the problem, and a successful July 1 tank test cleared the vehicle for flight. But Florida's notoriously dynamic weather prevented the next few launch attempts.

Finally, after a smooth countdown that saw steadily improving weather, *Endeavour* and its crew launched into orbit. They to completed assembly of the Japanese Kibo laboratory on the International Space Station by adding a "front porch" to expose experiments to space.

Nearly 16 days and more than 6.5 million miles after liftoff, Endeavour touched down at KSC at 9:48 a.m. CDT on the mission's first landing opportunity.

NASA/PHOTO S127-E-007954

STS-127 Mission Specialist Christopher Cassidy participates in Endeavour's *third spacewalk. This was Cassidy's first of three spacewalks at the station.*

STS-128

Space Shuttle *Discovery* roared into the skies over KSC on Aug. 28 at 10:59 p.m. CDT to begin a two-day chase of the station. *Discovery's* payload bay was filled with the Leonardo Multi-Purpose Logistics Module, experiments, scientific equipment and the COLBERT, a treadmill that found fame as the namesake of comedian Stephen Colbert. The Lightweight Multi-Purpose Experiment Support Structure Carrier was also a part of the payload.

Commander Rick Sturckow led the STS-128 mission, with Kevin Ford serving as pilot. Also serving aboard *Discovery* were Mission Specialists Patrick Forrester, José Hernández, John "Danny" Olivas, Christer Fuglesang and Nicole Stott.

Stott remained on the station as an Expedition 20 flight engineer, replacing Tim Kopra, who returned home aboard *Discovery* as a mission specialist. STS-128 concluded on Sept. 11 at 7:53 CDT at Edwards Air Force Base in California.

This was *Discovery's* 37th mission to space and the 30th mission of a space shuttle dedicated to the assembly and maintenance of station.

NASA/PHOTO S128-E-007628

This scene, photographed from the station while docked with Discovery *(STS-128), shows the orbiter and a Soyuz vehicle docked with the orbital outpost.*

STS-129

Space Shuttle *Atlantis* launched into space on Nov. 16 at 1:28 p.m. CST, carrying the STS-129 crew of six to the space station.

STS-129 was commanded by Charles O. Hobaugh. Barry Wilmore served as pilot. Mission specialists were Robert L. Satcher Jr., Mike Foreman, Randy Bresnik and Leland Melvin. Wilmore, Satcher and Bresnik made their first trips to space.

The mission returned station crew member Nicole Stott to Earth. STS-129 was the final space shuttle crew rotation flight to or from the space station.

The crew's duties included three spacewalks and the installation of two platforms to the station's truss, or backbone. The platforms hold large spare parts to sustain station operations after the shuttles are retired. The shuttle crew delivered about 30,000 pounds of replacement parts for station systems. These parts will mean more years added to the station's life.

The crew landed on Nov. 27 at 8:44 a.m. CST at KSC.

The shuttle left the space station 86 percent complete, weighing 759,222 pounds. It was the fifth and final shuttle flight of 2009.

NASA/PHOTO S129-E-008320

This close-up view of a water bubble floating freely on the middeck of Space Shuttle Atlantis *shows a refracted image of astronaut Leland Melvin, STS-129 mission specialist.*

Statistics

NASA Johnson Space Center Economic Impact in Texas | **Fiscal Year 2009**

While Johnson Space Center has earned a global reputation for achievements in space exploration, less evident are the economic benefits the institution brings locally and to the state of Texas. JSC's role is a vital part of regional and state economies. Here are some highlights:

- In Fiscal Year 2009 (FY09), JSC obligated a total of $5.1 billion, or about one-third of the agency total.
- About $4.7 billion of the total obligation ($5.1 billion) was for contracts and grants.
- 107 large businesses performed portions of the contracts, totaling slightly more than $3.4 billion in Texas.
- $185 million went to 125 small businesses working in Texas.
- JSC obligated almost $22.5 million on grants, contracts and agreements with Texas universities and education institutions in FY09.
- JSC did over $56 million in business with women-owned businesses in Texas.
- Nearly $37.5 million was spent on contracts performed in Texas by veteran-owned businesses.
- Nearly $15.2 million of JSC funding in FY09 was obligated on grants, contracts and agreements with nonprofit organizations.

PROGRAM	OBLIGATIONS ($B)	OBLIGATIONS %
Space Shuttle	1.8	30%
International Space Station	1.8	30%
Exploration	1.8	30%
Cross-Agency Supt. (Inc. Institution)	0.5	8%
Other	0.1	2%
Total	6.0	100%

JSC and White Sands Test Facility Civil Service Workforce by Communities FY09

COMMUNITIES	HEADCOUNT	SALARY ($M)
Clear Lake Area	**2,497**	**282.0**
Bacliff/Kemah/San Leon	42	4.5
Clear Lake	990	114.1
Dickinson	68	6.5
Friendswood	364	43.5
LaPorte/Shoreacres	27	2.2
League City	654	72.3
Seabrook/El Lago/Taylor Lake	267	30.7
Webster	85	8.2
HOUSTON REGION	**815**	**82.6**
Houston (except Clear Lake)	363	35.8
Alvin	43	4.2
Deer Park	20	1.7
Pasadena	31	2.9
Pearland	166	19.0
Brazoria County	23	2.5
Fort Bend County	55	5.6
Other Houston Region Areas	114	10.9
Clear Lake and Houston Region Total	**3,312**	**364.6**
Houston Region Total	**114**	**114**
Other Areas of Texas Total	**48**	**2.6**
Outside of Texas Total	**225**	**18.3**
Grand Total	**3,585**	**385.5**

Note: The number of civil servants is a headcount value as of Nov. 30, and the salary shown reflects the adjusted basic pay within the Federal Personnel and Payroll System database for calendar year 2009. The adjusted basic pay is defined as an employee's basic pay plus the locality differential. Income numbers are rounded.

** The "outside of Texas" value includes White Sands Test Facility.*

Roundup

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Education

Employ

Internships

The Office of Education contributes to current and future workforce needs by placing over 200 interns each year in engineering, science, administrative and clerical positions, which equals the work of 80 full-time employees. Students are matched individually to projects based on their skills and the needs of the organization. Education works with Human Resources to pipeline interns into full-time employment in the aerospace industry upon graduation. In 2009, over 4,000 students from about 400 universities applied to Johnson Space Center internships, reflecting diversity in education majors, gender and ethnicity.

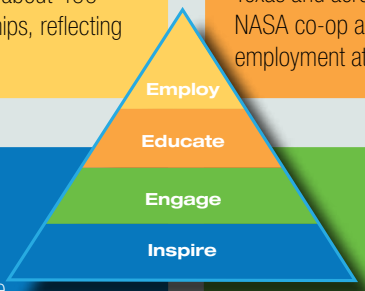
PHOTO: NIYATI MODY

Educate

Texas High School Aerospace Scholars

In 2009, Texas High School Aerospace Scholars (HAS) celebrated its 10th year. This milestone anniversary was celebrated at the summer's closing event, where program creators were recognized and honored with a certificate and flag flown on STS-118 with educator astronaut Barbara Morgan. Since its inception, more than 2,100 students have participated in the robust, hands-on experience at JSC. These participants continue their quest for learning by pursuing studies at universities here in Texas and across the United States. HAS alumni also merge into NASA co-op and intern programs, while others return to full-time employment at JSC and other NASA centers.

NASA/PHOTO



Inspire

Teaching from Space

Students around the world had the opportunity to speak live with International Space Station and shuttle crew members during approximately 143 real-time, on-orbit education events. Millions were reached through the live question-and-answer sessions, including kids at President Barack Obama's alma mater, Punahou School in Hawaii.

PHOTO: PUNAHOU SCHOOL

Engage

Digital Learning Network

Approximately 5,000 students and educators from across the country joined the Digital Learning Network (DLN) at JSC to participate in a special event featuring highlights from the DLN module "Suits: Step Into the Void." It showcased elements and unique features from the spacesuits and spacewalking Web site. They also joined in discussion on the challenges of spacewalking and the importance of spacesuits with astronaut Dr. Don Thomas. The event was broadcasted live via videoconference, Web casted on the DLN Web site and streamed in Second Life.

NASA/PHOTO